IN THE CLAIMS:

The listing of claims below is intended to replace all prior listings of claims presented in the above-identified application.

Claims 1 – 22 stand cancelled.

23. (CURRENTLY AMENDED) A recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising ~~approximately~~ 5 to 25 MUC1 tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from ~~the~~ SEQ ID NO:2 by using ~~alternative~~ wobbled codons to reduce homology between the tandem repeats units while retaining the amino acid sequence of SEQ ID NO:1.

24. (CURRENTLY AMENDED) The recombinant pox virus of claim 23, wherein the immunogenic MUC1 fragment comprises ~~approximately~~ 7 to 15 MUC1 tandem repeat units.

25. (PREVIOUSLY PRESENTED) The recombinant pox virus of claim 24, wherein the immunogenic MUC1 fragment comprises 10 MUC1 tandem repeat units.

26. (PREVIOUSLY PRESENTED) The recombinant pox virus of claim 23, wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.

27. (CURRENTLY AMENDED) A pharmaceutical composition comprising a recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising ~~approximately~~ 5 to 25 MUC1 tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from ~~the~~ SEQ ID NO:2 ~~native tandem repeat pattern~~ by using ~~alternative~~ wobbled codons to reduce homology between the repeats while retaining the amino acid sequence of SEQ ID NO:1, and an immunomodulator.

28. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 27, wherein the immunomodulator is selected from the group consisting of T-cell co-stimulatory factors and cytokines.

29. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 28, wherein the cytokine is an interleukin.

30. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 27, wherein the immunomodulator is both a T-cell co-stimulatory factor and a cytokine.

31. (PREVIOUSLY PRESENTED) The recombinant pox virus of claim 27, wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.

32. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 27, wherein the immunomodulator is encoded by a nucleic acid sequence on a separate pox virus from said recombinant pox virus comprising the nucleic acid sequence encoding said immunogenic MUC1 fragment.

33. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 27, wherein the immunomodulator and the immunogenic MUC fragment are both encoded by nucleic acid sequences located on a single pox virus.

34. (PREVIOUSLY PRESENTED) The pharmaceutical composition of claim 27, wherein said MUC1 fragment comprises about 7 to 15 tandem repeat units.

35. (PREVIOUSLY PRESENTED) A method of generating an immune response in a mammal having a MUC1-expressing tumor comprising:

(a) administering to the mammal the pox virus of claim 23; and

(b) administering a second amount of pox virus wherein the pox virus is selected from the group consisting of orthopox, suipox and avipox.

36. (PREVIOUSLY PRESENTED) The method of claim 35, wherein said boosting is administered by using an effective amount of second recombinant pox virus from a different viral genus from said pox virus of claim 1.

37. (PREVIOUSLY PRESENTED) The method of claim 35, wherein said mammal is further administered an immunomodulator.

38. CANCELLED

39. (PREVIOUSLY PRESENTED) The method of claim 35, wherein the boosting comprises an effective amount of MUC1 administered as a MUC1 peptide or as a nucleic acid sequence that encodes said MUC peptide.

40. CANCELLED

41. (PREVIOUSLY PRESENTED) A method for generating an immune response in a mammal that contains a MUC1-expressing tumor comprising administering to said mammal at least one pox virus of claim 26.

42. (PREVIOUSLY PRESENTED) The recombinant pox virus of claim 23, wherein the pox virus is MVA.

43. (CURRENTLY AMENDED) A method for treating a host having tumor cells expressing MUC-1 comprising the steps of:

i) administering to a host a first recombinant pox virus vector system that encodes a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 5 to

25 MUC1 tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from ~~the native tandem repeat pattern~~ SEQ ID NO: 2 by using ~~alternative~~ wobbled codons to reduce homology between the tandem repeats ~~units while retaining the amino acid sequence of SEQ ID NO: 1~~; and

ii) administering, thereafter, at least a second recombinant pox virus vector, wherein the pox virus vector is from a different pox virus genus than the first pox virus vector, wherein the second recombinant pox virus vector encodes a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 5 to 25 MUC1 tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from ~~the native tandem repeat pattern~~ SEQ ID NO:2 by using ~~alternative~~ wobbled codons to reduce homology between the repeats while retaining the amino acid sequence of SEQ ID NO:1, thereby boosting said host.

44. (PREVIOUSLY PRESENTED) The method of claim 43, further comprising administering an immunomodulator.

45. (PREVIOUSLY PRESENTED) The method of claim 44, wherein the immunomodulator is a cytokine or a co-stimulatory molecule.

46. (PREVIOUSLY PRESENTED) The method of claim 45, wherein said co-stimulatory molecule B7.

47. (PREVIOUSLY PRESENTED) The method of claim 46, wherein said B7 is B7.1 or B7.2.

48. (PREVIOUSLY PRESENTED) The method of claim 45, wherein the cytokine is an interleukin.

49. (PREVIOUSLY PRESENTED) The method of claim 43, wherein said first recombinant pox virus vector is a pox virus vector selected from the group consisting of an orthopox virus vector, an avipox virus vector, a suipox virus vector, and a capripox virus vector.

50. (PREVIOUSLY PRESENTED) The method of claim 49, wherein the first recombinant pox virus vector is an orthopox virus vector.

51. (PREVIOUSLY PRESENTED) The method of claim 50, wherein the orthopox virus vector is a vaccinia virus vector.

52. (PREVIOUSLY PRESENTED) The method of claim 50, wherein the vaccinia virus is an MVA.

53. (PREVIOUSLY PRESENTED) The method of claim 50, wherein said second recombinant pox virus vector is selected from the group consisting of an avipox virus vector, a suipox virus vector, and a capripox virus vector.

54. (PREVIOUSLY PRESENTED) The method of claim 43, wherein the first recombinant pox vector is an orthopox virus vector and the second recombinant pox vector is an avipox virus vector.

55. (PREVIOUSLY PRESENTED) The method of claim 54, wherein the avipox virus vector is a fowlpox virus vector.

56. (PREVIOUSLY PRESENTED) The method of claim 54, wherein the orthopox virus is a vaccinia virus.

57. (PREVIOUSLY PRESENTED) The method of claim 56, wherein the vaccinia virus is MVA.

58. (PREVIOUSLY PRESENTED) The method of claim 43, wherein said first recombinant pox virus vector further comprises a nucleic acid sequences encoding an immunomodulator.

59. (PREVIOUSLY PRESENTED) The method of claim 43 or 58, wherein the second recombinant pox virus vector further comprises a nucleic acid sequences encoding an immunomodulator.

60. (NEW) The recombinant pox virus of claim 23, wherein the altered nucleic acid sequences are selected from the group consisting of SEQ ID NOS: 2-12.

61. (NEW) The pharmaceutical composition of claim 27, wherein the altered nucleic acid sequences are selected from the group consisting of SEQ ID NOS: 2-12.

62. (NEW) The method of claim 43, wherein the altered nucleic acid sequences are selected from the group consisting of SEQ ID NOS: 2-12.

63. (NEW) A recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 5 to 25 MUC1 tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from SEQ ID NO:2 by substituting at least one codon such that the nucleic acid codes for a conservative amino acid change, wherein said conservative amino acid change is selected from the group consisting of substituting at least one of the glycines in the SEQ ID NO:1 to serine, at least one of the serines in the SEQ ID NO:1 to glycine, and the valine in the SEQ ID NO:1 to leucine.

64. (NEW) A recombinant pox virus comprising a nucleic acid sequence encoding an immunogenic MUC1 fragment comprising 6 identical tandem repeat units, said tandem repeat unit having an amino acid sequence of SEQ ID NO:1, wherein said nucleic acid sequence is altered from SEQ ID NO:2 by using wobbled codons to reduce homology between the tandem repeats units while retaining the amino acid sequence of SEQ ID NO:1.